Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.   (Canceled)

2.   (Withdrawn)   The image pickup system according to claim 4̶3̶ 1̶, further comprising:

color filters arranged at a front of the image pickup element; and

separating means for separating the signals output from the image pickup element into signals for each of the color filters.

3.   (Withdrawn)   The image pickup system according to claim 2, wherein the noise estimating means comprises:

parameter calculating means for calculating parameters on at least one type of information selected among a signal value level of the signals, a temperature of the image pickup element, a gain of the signals, and a shutter speed during shooting; and

noise amount calculating means for calculating an estimated amount of noise based on the parameters calculated by the parameter calculating means.

4.   (Withdrawn)   The image pickup system according to claim 2, wherein the noise estimating means comprises upper limit value setting means for setting an upper limit value on the estimated amount of noise.

5.   (Withdrawn)   The image pickup system according to claim 2, wherein the noise reducing means comprises:

threshold value setting means for setting an amplitude value of the noise as a threshold value for each pixel or for each specified unit area comprising a plurality of pixels based on the amount of noise estimated by the noise estimating means; and

smoothing means for reducing an amplitude component in the signals which are below the threshold value set by the threshold value setting means.

6.   (Withdrawn)   The image pickup system according to claim 2, wherein the noise reducing means comprises:

control value setting means for setting control values used to control frequency characteristics of the smoothing processing based on the amount of noise estimated by the noise estimating means; and

smoothing means for performing smoothing processing that reduces a specified frequency band in the signals based on control values set by the control value setting means.

7.   (Withdrawn)   The image pickup system according to claim 3, wherein the parameter calculating means comprises signal value calculating means for determining signal value levels by averaging a plurality of pixel values in a nearby region of a specified size or in the unit area that includes the pixel of interest.

8.   (Withdrawn)   The image pickup system according to claim 3,

wherein the parameter calculating means comprises a temperature sensor that measures a temperature of the image pickup element.

9.   (Withdrawn)   The image pickup system according to claim 3, wherein the image pickup element comprises an OB (optical black) region, and the parameter calculating means comprises:

variance calculating means for calculating a variance of the signals in the OB region; and

temperature estimating means for estimating a temperature of the image pickup element based on the variance calculated by the variance calculating means.

10.   (Withdrawn)   The image pickup system according to claim 3, wherein the parameter calculating means comprises gain calculating means for determining the gain based on at least one type of information selected among ISO sensitivity, exposure information and white balance information.

11.   (Withdrawn)   The image pickup system according to claim 3, wherein the parameter calculating means comprises shutter speed calculating means for determining shutter speed employed during the shooting from exposure information.

12.   (Withdrawn)   The image pickup system according to claim 3, wherein the noise amount calculating means calculates an amount of noise N employing the signal value level L of the signals, the temperature T of the image pickup element, the gain G of the signals and the shutter speed S during shooting

as parameters, and the noise amount calculating means comprises:

coefficient calculating means for calculating four (4) coefficients A, B, C and D based on three functions a(T, G), b(T, G) and c(T, G) using the temperature T and gain G as parameters, and a function d(S) using the shutter speed S as a parameter; and

function calculating means for calculating the amount of noise N based on an equation

$$N = (AL^B + C)D$$

defined by the four (4) coefficients A, B, C and D calculated by the coefficient calculating means.

13.   (Withdrawn)   The image pickup system according to claim 12, wherein the noise amount calculating means further comprises assigning means for assigning standard parameter values, and the parameters are values calculated by the parameter calculating means, or standard values assigned by the assigning means.

14.   (Withdrawn)   The image pickup system according to claim 3, wherein the noise amount calculating means comprises:

assigning   means   for   assigning   standard   parameter   values   for parameters not obtained from the parameter calculating means; and

look-up table means for determining the amount of noise by inputting the signal value level, temperature, gain and shutter speed obtained from the parameter calculating means or the assigning means.

15.   (Canceled)

16.   (Previously presented)   The image pickup system according to claim 43 1, wherein the noise estimating means comprises an upper limit value setting means for setting an upper limit value on the estimated amount of noise.

17.   (Previously presented)   The image pickup system according to claim 43 1, wherein the noise reducing means comprises:

threshold value setting means for setting an amplitude value of the noise as a threshold value for each pixel or for each specified unit area comprising a plurality of pixels on the basis of the amount of noise estimated by the noise estimating means; and

smoothing means for excluding the amplitude components in the signals which are below the threshold value set by the threshold value setting means.

18.   (Withdrawn)   The image pickup system according to claim 43 1, wherein the noise reducing means comprises:

control value setting means for setting control values used to control frequency characteristics of smoothing processing based on the amount of noise estimated by the noise estimating means; and

smoothing means for performing smoothing processing that reduces a specified frequency band in the signals based on the control values set by the control value setting means.

19.   (Currently amended)   The image pickup system according to claim 43 [[15]], wherein the parameter calculating means comprises signal value

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calculating means for calculating the signal value levels by averaging a plurality of pixel values in a nearby region of a specified size or in the unit area that includes the pixel of interest.

20.   (Withdrawn)   The image pickup system according to claim <u>43</u> ~~15~~, wherein the parameter calculating means comprises a temperature sensor that measures the temperature of the image pickup element.

21.   (Currently amended)   The image pickup system according to claim <u>43</u> [[15]], wherein the image pickup element comprises an OB (optical black) region, and the parameter calculating means comprises:

        variance calculating means for calculating the variance of the signals in the OB region; and

        temperature estimating means for estimating the temperature of the image pickup element on the basis of the variance calculated by the variance calculating means.

22.   (Currently amended)   The image pickup system according to claim <u>43</u> [[15]], wherein the parameter calculating means comprises gain calculating means for determining the gain on the basis of at least one type of information selected among the ISO sensitivity, exposure information and white balance information.

23.   (Currently amended)   The image pickup system according to claim <u>43</u> [[15]], wherein the parameter calculating means comprises shutter speed calculating means for determining the shutter speed during the shooting from

exposure information.

24. (Currently amended)   The image pickup system according to claim
43 [[15]], wherein the noise amount calculating means calculates the amount of
noise N using the signal value level L of the signals, the temperature T of the image
pickup element, the gain G for the signals and the shutter speed S during shooting
as parameters, and the noise amount calculating means comprises:

coefficient calculating means for calculating four coefficients A, B, C
and D on the basis of three functions a(T, G), b(T, G) and c(T, G) using the
temperature T and gain G as parameters, and a function d(S) using the shutter
speed S as a parameter; and

function calculating means for calculating the amount of noise N on
the basis of a functional equation

$$N = (AL^B + C)D$$

defined by the four coefficients A, B, C and D calculated by the coefficient
calculating means.

25. (Original)   The image pickup system according to claim 24, wherein
the noise amount calculating means further comprises assigning means for
assigning standard parameter values, and the parameters are values calculated by
the parameter calculating means, or standard values assigned by the assigning
means.

26. (Withdrawn)   The image pickup system according to claim 43 15,
wherein the noise amount calculating means comprises:

assigning means for assigning standard parameter values for

parameters not obtained from the parameter calculating means; and

look-up table means for determining the amount of noise by inputting the signal value level, temperature, gain and shutter speed obtained from the parameter calculating means or the assigning means.

27.   (Withdrawn)   An image pickup system comprising:

separating means for separating digitized signals from an image pickup element which has primary- or complementary-color filters arranged at a front thereof into color signals for each of the color filters;

signal value calculating means for determining a signal value level for the respective color signals by averaging a plurality of pixel values in a nearby region of a specified size or in a unit area that includes a pixel of interest;

gain calculating means for determining a gain for the signals based on at least one type of information selected among ISO sensitivity, exposure information and white balance information;

look-up table means for determining an amount of noise by inputting the signal value level and the gain for the respective color signals and referring to a look-up table which provides a correspondence between the input values and the amount of noise;

small amplitude value setting means for setting a small amplitude value for each pixel or for each specified unit area comprising a plurality of pixels based on the amount of noise for the respective color signals; and

smoothing means for reducing amplitude components that are equal to or less than the small amplitude value set by the small amplitude value setting means for the respective color signals.

28.   (Currently amended)   An image processing program <u>stored in a computer readable medium executed by a computer in an image pickup system,</u> for performing routines, <u>said program</u> comprising:

a noise estimating routine for estimating <u>an</u> amount of noise contained in digitized signals from an image pickup element <u>in the image pickup system</u> in which a plurality of pixels are arranged, either for each pixel or for each specified unit area comprising a plurality of pixels;

a threshold value setting routine for setting <u>an</u> amplitude value of the noise as a threshold value for each pixel or each specified unit area comprising a plurality of pixels on the basis of the amount of noise estimated by the noise estimating routine; and

a smoothing routine for <u>excluding</u> the amplitude components in the signals that are equal to or less than the threshold value set by the threshold value setting routine.

29.   (Withdrawn)   An image processing program <u>stored in a computer readable medium executed by a computer in an image pickup system,</u> comprising:

a noise estimating routine for estimating an amount of noise contained in digitized signals from an image pickup element in which a plurality of pixels are arranged, either for each pixel or for each specified unit area comprising a plurality of pixels;

a control value setting routine for setting control values used to control frequency characteristics of a smoothing processing based on the amount of noise estimated by the noise estimating routine; and

a smoothing routine for performing smoothing processing that reduces a specified frequency band in the signals based on the control values set by the

control value setting routine.

30. (Currently amended) An image processing program <u>stored in a</u> <u>computer readable medium executed by a computer in an image pickup system for</u> <u>performing routines, said program</u> comprising:

a variance calculating routine for calculating ~~the~~ <u>a</u> signal variance in ~~the~~ OB regions of digitized signals from an image pickup element <u>in the image</u> <u>pickup system</u> in which a plurality of pixels are arranged and which has an OB (optical black) region;

a temperature estimating routine for estimating the temperature of the image pickup element on the basis of the variance calculated by the variance calculating routine;

a parameter calculating routine for calculating parameters on the basis of at least one type of information selected <u>from</u> among the temperature of the image pickup element estimated by the temperature estimating routine, ~~the~~ <u>a</u> signal value level of the signals, ~~the~~ <u>a</u> gain for the signals and ~~the~~ <u>a</u> shutter speed during shooting <u>of a shutter in the pickup system</u>;

a noise amount calculating routine for calculating ~~the~~ <u>an</u> amount of noise estimated to be contained in the signals on the basis of the parameters calculated by the parameter calculating routine, either for each pixel or a specified unit area comprising a plurality of pixels; and

a noise reducing routine for reducing the noise in the signals on the basis of the amount of noise calculated by the noise amount calculating routine.

31. (Currently amended) An image processing program <u>stored in a</u> <u>computer readable medium executed by a computer in an image pickup system for</u>

performing routines, said program comprising:

a parameter calculating routine for calculating ~~the~~ a signal value level L of digitized signals from an image pickup element in the pickup system in which a plurality of pixels are arranged, ~~the~~ a temperature T of the image pickup element, ~~the~~ a gain G for the signals and ~~the~~ a shutter speed S of a shutter in the pickup system during shooting as parameters;

a coefficient calculating routine for calculating four coefficients A, B, C and D on the basis of three functions a(T, G), b(T, G) and c(T, G) using the temperature T and gain G as parameters, and a function d(S) using the shutter speed S as a parameter;

a function calculating routine for calculating ~~the~~ an amount of noise N estimated to be contained in the signals on the basis of a functional equation

$$N = (AL^B + C)D$$

defined by the four coefficients A, B, C and D calculated by the coefficient calculating routine, either for each pixel or for each specified unit area comprising a plurality of pixels; and

a noise reducing routine for reducing the noise in the signals on the basis of the amount of noise calculated by the function calculating routine.

32.   (Withdrawn)   An image processing program comprising:

a separating routine for separating digitized signals from an image pickup element which has primary- or complementary-color filters arranged at a front thereof into color signals for each of the color filters;

a signal value calculating routine for determining a signal value level for the respective color signals by averaging a plurality of pixel values in a nearby region of a specified size or in a unit area that includes the pixel of interest;

a gain calculating routine for determining a gain for the signals based on at least one type of information selected among ISO sensitivity, exposure information and white balance information;

a look-up table routine for determining an amount of noise by inputting the signal value level and the gain for the respective color signals and referring to a look-up table in which a correspondence between the input values and the amount of noise is provided;

a small amplitude value setting routine for setting a small amplitude value for each pixel or for each specified unit area comprising a plurality of pixels based on the amount of noise for the respective color signals; and

a smoothing routine for reducing amplitude components that are equal to or less than the small amplitude value set by the small amplitude value setting routine for the respective color signals.

33.   (Canceled)

34.   (Canceled)

35.   (Currently amended)   The image pickup system according to claim 44 33, wherein the noise estimating unit comprises an upper limit value setting unit for setting an upper limit value on the estimated amount of noise.

36.   (Currently amended)   The image pickup system according to claim 44 33, wherein the noise reducing unit comprises:

a threshold value setting unit for setting an amplitude value of the noise as a threshold value for each pixel or for each specified unit area comprising a

plurality of pixels on the basis of the amount of noise estimated by the noise estimating unit; and

a smoothing unit for excluding the amplitude components in the signals which are below the threshold value set by the threshold value setting unit.

37.   (Currently amended)   The image pickup system according to claim <u>44</u> 34, wherein the parameter calculating unit comprises a signal value calculating unit for calculating the signal value levels by averaging a plurality of pixel values in a nearby region of a specified size or in the unit area that includes the pixel of interest.

38.   (Currently amended)   The image pickup system according to claim <u>44</u> 34, wherein the image pickup element comprises an OB (optical black) region, and the parameter calculating unit comprises:

a variance calculating unit for calculating the variance of the signals in the OB region; and

a temperature estimating unit for estimating the temperature of the image pickup element on the basis of the variance calculated by the variance calculating unit.

39.   (Currently amended)   The image pickup system according to claim <u>44</u> 34, wherein the parameter calculating unit comprises a gain calculating unit for determining the gain on the basis of at least one type of information selected among the ISO sensitivity, exposure information and white balance information.

40.   (Currently amended)   The image pickup system according to claim

~~44~~ 34, wherein the parameter calculating unit further comprises a shutter speed calculating unit for determining the shutter speed during the shooting from exposure information.

41.   (Currently amended)   The image pickup system according to claim ~~44~~ 34, wherein the noise amount calculating unit calculates the amount of noise N using the signal value level L of the signals, the temperature T of the image pickup element, the gain G for the signals and the shutter speed S during shooting as parameters, and the noise amount calculating unit comprises:

a coefficient calculating unit for calculating four coefficients A, B, C and D on the basis of three functions a(T, G), b(T, G) and c(T, G) using the temperature T and gain G as parameters, and a function d(S) using the shutter speed S as a parameter; and

a function calculating unit for calculating the amount of noise N on the basis of a functional equation

$N = (AL^B + C)D$

defined by the four coefficients A, B, C and D calculated by the coefficient calculating unit.

42.   (Previously presented)   The image pickup system according to claim 41, wherein the noise amount calculating unit further comprises an assigning unit for assigning standard parameter values, and the parameters are values calculated by the parameter calculating unit, or standard values assigned by the assigning unit.

43.   (New)   An image pickup system comprising:

noise estimating means *(13)* comprising:

parameter calculating means *(31, 32)* for calculating parameters *(A, B, C & D)* of a function using the signal value level *(L)* of digitized signals from an image pickup element in which a plurality of pixels are arranged, and at least one type of information selected from, the temperature *(T)* of the image pickup element, the gain *(G)* for the signals and the shutter speed *(S)* during shooting;

noise amount calculating means *(33)* for calculating an amount of noise *(N)* contained in the signals, for one of each pixel and each specified area comprising a plurality of pixels *(page 25, lines 18-23 of the specification)* responsive to the parameters *(A, B, C & D)* calculated by the parameter calculating means; and

noise reducing means *(12)* for reducing the noise contained in the signals on the basis of the amount of noise calculated by the noise calculating means.

44. (New) An image pickup system comprising:

a noise estimating unit *(13)* comprising:

a parameter calculating unit *(31, 32)* for calculating parameters *(A, B, C & D)* of a function using the signal value level *(L)* of digitized signals from an image pickup element in which a plurality of pixels are arranged, and at least one type of information selected from, the temperature *(T)* of the image pickup element, the gain *(G)* for the signals and the shutter speed *(S)* during shooting;

a noise amount calculating unit *(33)* for calculating an amount of noise *(N)* contained in the signals, for one of each pixel and each specified area comprising a plurality of pixels *(page 25, lines 18-23 of the specification)* responsive to the parameters *(A, B, C & D)* calculated by the parameter calculating

unit; and

a noise reducing unit *(12)* for reducing the noise contained in the signals on the basis of the amount of noise calculated by the noise calculating unit.

45. (New) The image pickup system according to claim 43, the noise amount calculating means employing said function which derives a noise amount according to said signal level.

46. (New) The image pickup system according to claim 44, the noise amount calculating unit employing said function which derives a noise amount according to said signal level.